What is claimed:

1. A non-invasive method for diagnosing pathology in the bladder of a patient comprising the steps of:

placing a plurality of electrodes on the patient;

acquiring vesico internal sphincter electromyogram (VISEMG) waveforms from the electrodes on a patient;

converting the VISEMG waveforms to non-invasive (NI) urodynamic graphs;

displaying the results of the method; and

diagnosing the condition of the bladder.

2. The method of claim 1 further comprising the step of assessing the condition of the bladder automatically based on the VISEMG waveforms.

3. The method of claim 1 wherein displaying the results comprises displaying the NI urodynamic graphs.

4. The method of claim 1 wherein displaying the results comprises displaying the VISEMG waveforms.

5. The method of claim 1 wherein displaying the results comprises displaying the diagnosis of bladder condition based on the VISEMG waveforms.

6. The method of claim 1 wherein placing the electrodes on the patient comprises placing a plurality of surface patches on the patient's abdomen including the suprapubic and perineal regions.

7. An apparatus for diagnosing bladder pathology from electromyographic (VISEMG) waveforms comprising:

a plurality of surface electrodes;

a plurality of input amplifiers for receiving electrical signals from VISEMG surface electrodes, each amplifier including at least one filter coupled to the amplifier for filtering each VISEMG signal;

an analog to digital converter (ADC) coupled to the amplifiers for sampling the analog signals and converting each sampled signal to a digital VISEMG waveform;

a conversion software for converting VISEMG waveforms to non-invasive (NI) urodynamic graphs;

a programmed computer to receive the digital signals and to convert them to NI urodynamic graphs; and

a display to output the results of the VISEMG measurement useful to diagnose the condition of the bladder based on the VISEMG measurement.

8. The apparatus of claim 7 wherein the display further comprises user selectable display modes to display information selected from the group consisting of NI graphs, NI graphs and bladder condition based on the VISEMG waveforms, VISEMG waveforms, VISEMG waveforms and bladder condition based on the VISEMG waveforms, and NI graphs and VISEMG waveforms and VISEMG waveforms and bladder condition based on the VISEMG waveforms.

9. The apparatus of claim 7 wherein the display displays NI urodynamic graphs converted from the digital VISEMG waveforms.

10. The apparatus of claim 9 wherein the display further displays suspected bladder pathologies based on the VISEMG waveforms.

11. The apparatus of claim 7 wherein the display displays a representation of the digital VISEMG waveform.

12. The apparatus of claim 7 wherein the display further displays suspected bladder pathologies based on the VISEMG waveforms.

13. The apparatus of claim 7 wherein the apparatus is portable.

14. The apparatus of claim 7 wherein the conversion software is updated from a media selected from the group consisting of CDROM, floppy disk, portable magnetic storage media, portable RAM drives, portable hard drives, and solid state drives.

15. The apparatus of claim 7 wherein the conversion software is updated from an update server by a communications mode selected from the group consisting of Internet, Intranet, cable, telephone, satellite, and wireless.

16. A method to diagnose the bladder condition of a patient, comprising:

applying measurement electrodes to the abdomen of the patient;

acquiring electrical signals from the electrodes to record action potentials;

amplifying the electrical signals; and

analyzing the electrical signals to diagnose the bladder condition.

17. The method of claim 16 wherein acquiring electrical signals comprises acquiring electrical signals from the electrodes in the areas of the body selected from the group consisting of the abdomen region, the supra pubic region and the perineal region.

18. The method of claim 16 wherein acquiring electrical signals comprises acquiring analog electrical signals from the electrodes representing action potentials, at a sampling frequency of between about .001 Hz and 5MHz.

19. The method of claim 18 wherein bladder activity is characterized by analyzing the stored electrical signals of at least one burst of action potentials.

20. The method of claim 19 wherein characterizing bladder activity comprises determining at least one of the parameters of the action potentials selected from the group of frequency duration, mean frequency, amplitude, power density spectrum of

the bursts and the frequency, duration, and amplitude of the at least one burst of action potentials.

21. The method of claim 19 wherein characterizing bladder activity comprises determining at least one of the parameters of the at least one burst selected from the group of frequency, duration, mean frequency, amplitude, power density spectrum, and amplitude.

22. The method of claim 16 wherein characterizing bladder activity comprises determining fast wavelet transform characteristics of the frequency components of the electrical signals.

23. The method of claim 16 wherein characterizing bladder activity comprises determining joint time-frequency characteristics of said frequency components of bursts of action potentials within the electrical signals.

24. The method of claim 19 wherein characterizing bladder activity comprises:

determining the mean frequency of the burst of action potentials;

determining the starting frequency of the burst of action potentials; and

determining the ending frequency of the burst of action potentials.

25. The method of claim 19 wherein characterizing bladder activity comprises

determining the rate of rise of amplitude of the at least one burst of action potentials; and

determining the rate of fall of amplitude of the at least one burst of action potentials.

26. The method of claim 19 wherein characterizing bladder activity comprises examining one or more trends in the electrical signals or parameters representing the electrical signals over time as indicated by the determined parameters.

27. The method of claim 26 further comprising displaying the one or more trends in bladder activity.

28. The method of claim 26 further comprising predicting future bladder activity based on one or more trends in bladder activity.

29. The method of claim 28 wherein predicting future bladder activity comprises the steps of:

comparing the one or more trends in bladder activity of a patient with trend data collected from other patients in order to identify matching trends; and

predicting future bladder activity for a patient under examination based on the trend behavior shown in the matching trends.

30. The method of claim 29 wherein the predicting is performed by a programmed computer functioning as an expert system.

31. An apparatus for recording and characterizing bladder electro-physiological muscle activity via abdominal surface recording comprising:

one or more electrodes capable of measuring action potentials recorded from the surface of a studied a patient;

an amplifier electrically coupled to said electrode to receive and amplify a signal indicative of action potentials measured by said electrode;

an analog to digital converter coupled to the amplifier for digitizing the signals from the amplifier;

a memory comprising sufficient storage capacity to store data resulting from a sampling of the action potentials, said memory coupled to receive a digital input from the analog to digital converter;

a filtering device capable of segregating and identifying electrical signals; and

a programmed computer, the computer programmed to analyze the frequency, duration, amplitude, and power density spectrum of action potentials, the programmed computer further being capable of characterizing bladder activity based upon the analysis.

32. The apparatus of claim 31 wherein one or more electrodes are applied to the patient's abdomen area, including the suprapubic and perineal regions.

33. The apparatus of claim 31 further comprises an audio amplifier and a speaker to make analog sounds indicative of action potentials measured by the electrode.

34. The apparatus of claim 31 wherein the memory comprises sufficient storage capacity to store data resulting from a sampling of electrical signals at a sampling frequency and a duration of time sufficient to record at least one burst of action potentials.

35. The apparatus of claim 31 wherein the programmed computer comprises an expert system for bladder diagnosis based one or more of the parameters representing action potentials selected from the group consisting of duration, amplitude, power density spectrum of action potential bursts, and power density spectrum of individual action potentials.

36. The apparatus of claim 31, further comprising a monitor coupled to said computer, the monitor capable of displaying said electrical signals.

37. A remote bladder monitoring system for remotely characterizing bladder activity, comprising:

at least one electrode capable of measuring action potentials from the abdominal surface of a patient under analysis and further capable of emitting an analog signal indicative of action potentials measured by the electrode;

an amplifier electrically coupled to the electrode to receive and amplify a signal indicative of action potentials measured by said electrode;

a data transmitter to receive the amplified signal from the amplifier and to transmit the signal to a location remote from the electrode;

a data receiver to receive the transmitted signal in the location remote from the electrode;

a filtering device to filter the electrical signals; and

a programmed computer, the programmed computer capable of characterizing bladder activity and condition based on the received signals.

38. The bladder monitoring system of claim 37 wherein the transmission is analog.

39. The bladder monitoring system of claim 37 further comprising an analog to digital converter coupled to the amplifier and wherein the transmitter is a digital transmitter.

40. The bladder monitoring system of claim 37 wherein the transmission type is selected from the group consisting of infra red (IR), acoustic, radio (wireless), wire, cable, and optical fiber.

41. The bladder monitoring system of claim 37 wherein the amplifier and transmitter are portable.